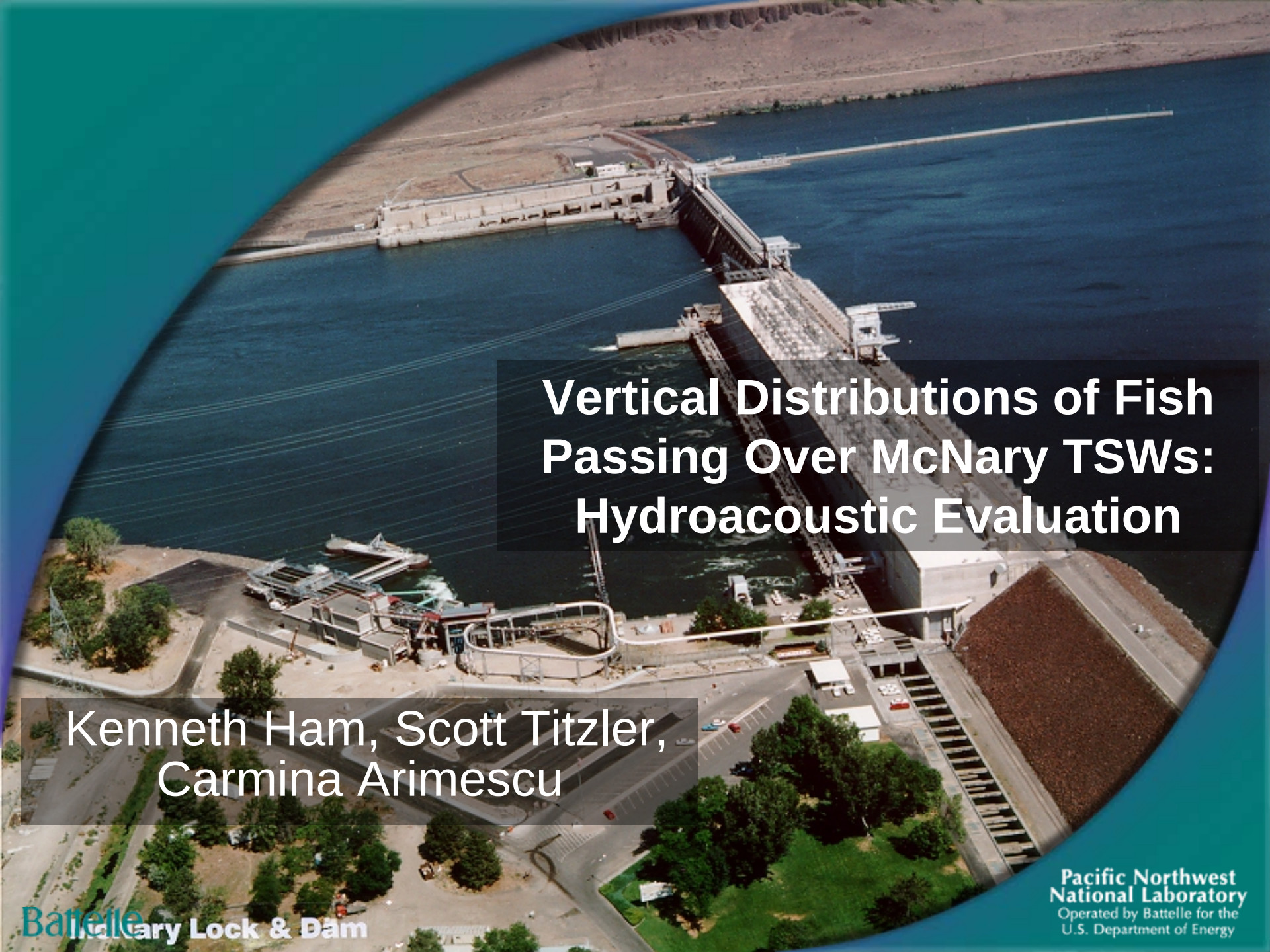
Vertical Distributions of Fish Passing Over McNary TSWs: Hydroacoustic Evaluation
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Pacific Northwest National Laboratory
Operated by Battelle for the U.S. Department of Energy

Objective

- Evaluate the distribution of run-at-large fish approaching and passing the McNary Dam TSWs
  - Provide context for shallow and deep release pipe elevations (balloon-tagged fish)
    - Potential for injury to populations of fish

Compare Vertical Distributions

- Season/Species
- TSW1 (bay 22)
  vs
  TSW2 (bay 20)
- Spill Treatments

Methods

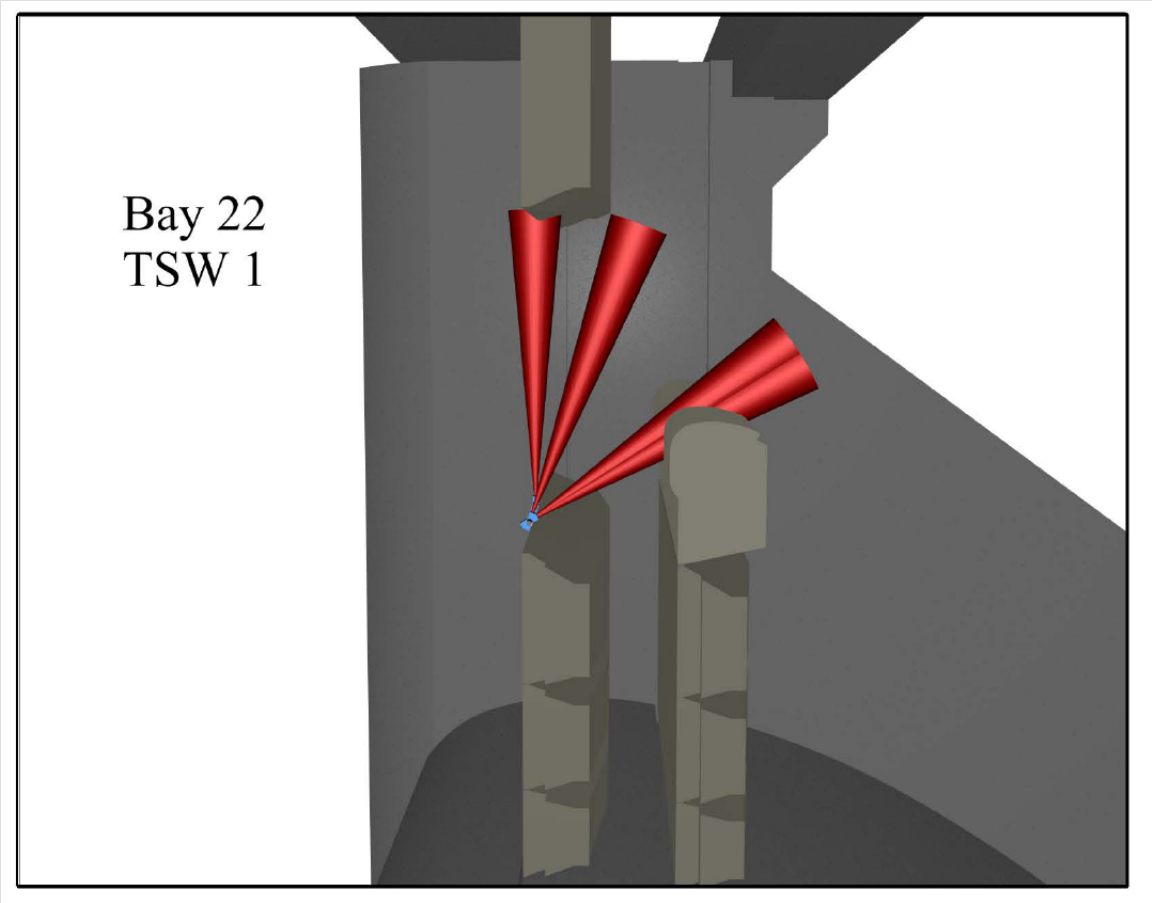
- Fixed-aspect active hydroacoustics
  - Send a sound pulse and listen for echoes bouncing off fish
- Sample run-at-large fish
  - All fish swimming through the beam
    - Tags not required
- Monitored fish passing TSW1 and TSW2
  - North, Center, and South locations within each TSW bay
- Sampling from April 13 to August 2
  - Some gaps at TSW1 due to equipment failure

Treatment Tests

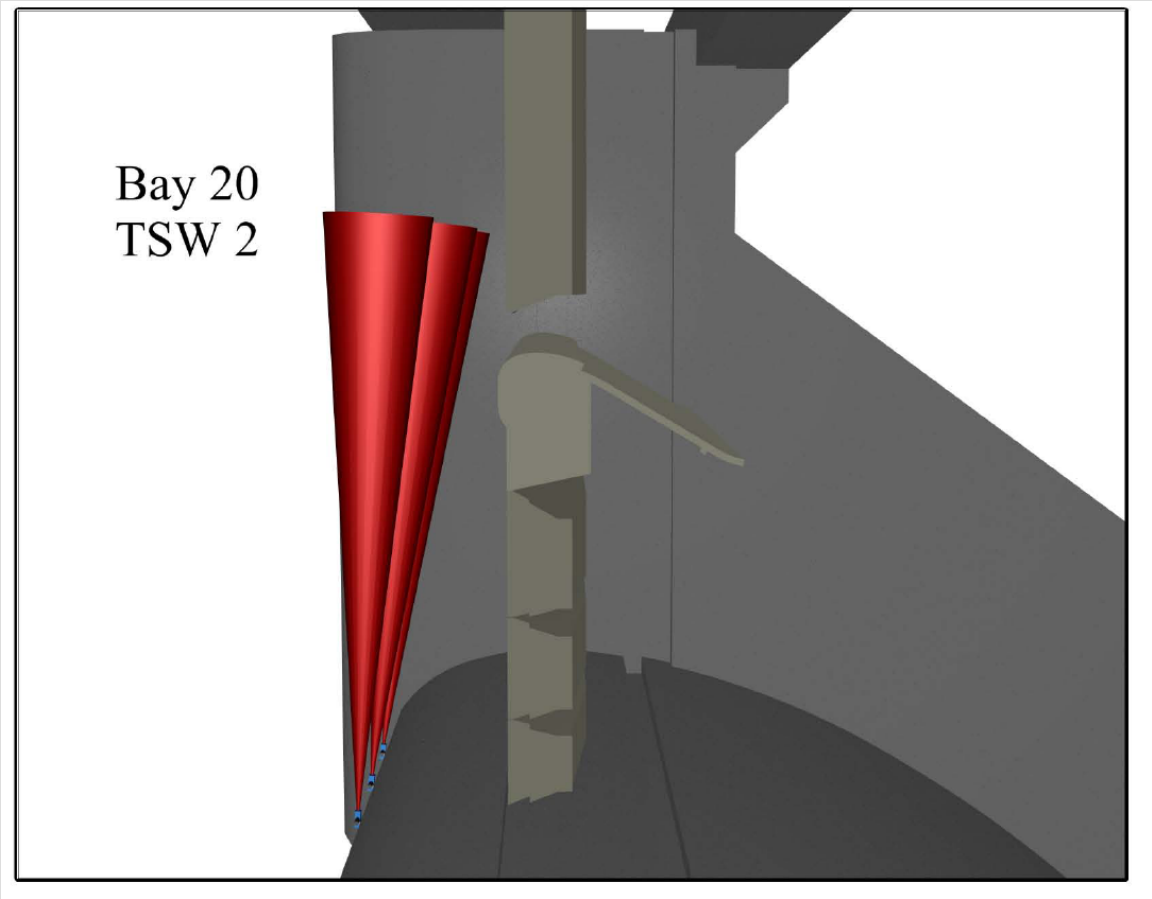
- Spring Study
  - 2006 Modified Spill Pattern (during 2007 passage)
  - 2007 Test Spill Pattern
- Summer Study
  - 40% Spill
  - 60% Spill

Echoes Recorded as Fish Pass Through Sample Area

Transducers Mounted on Lower Leaf in Stoplog Slot at TSW1



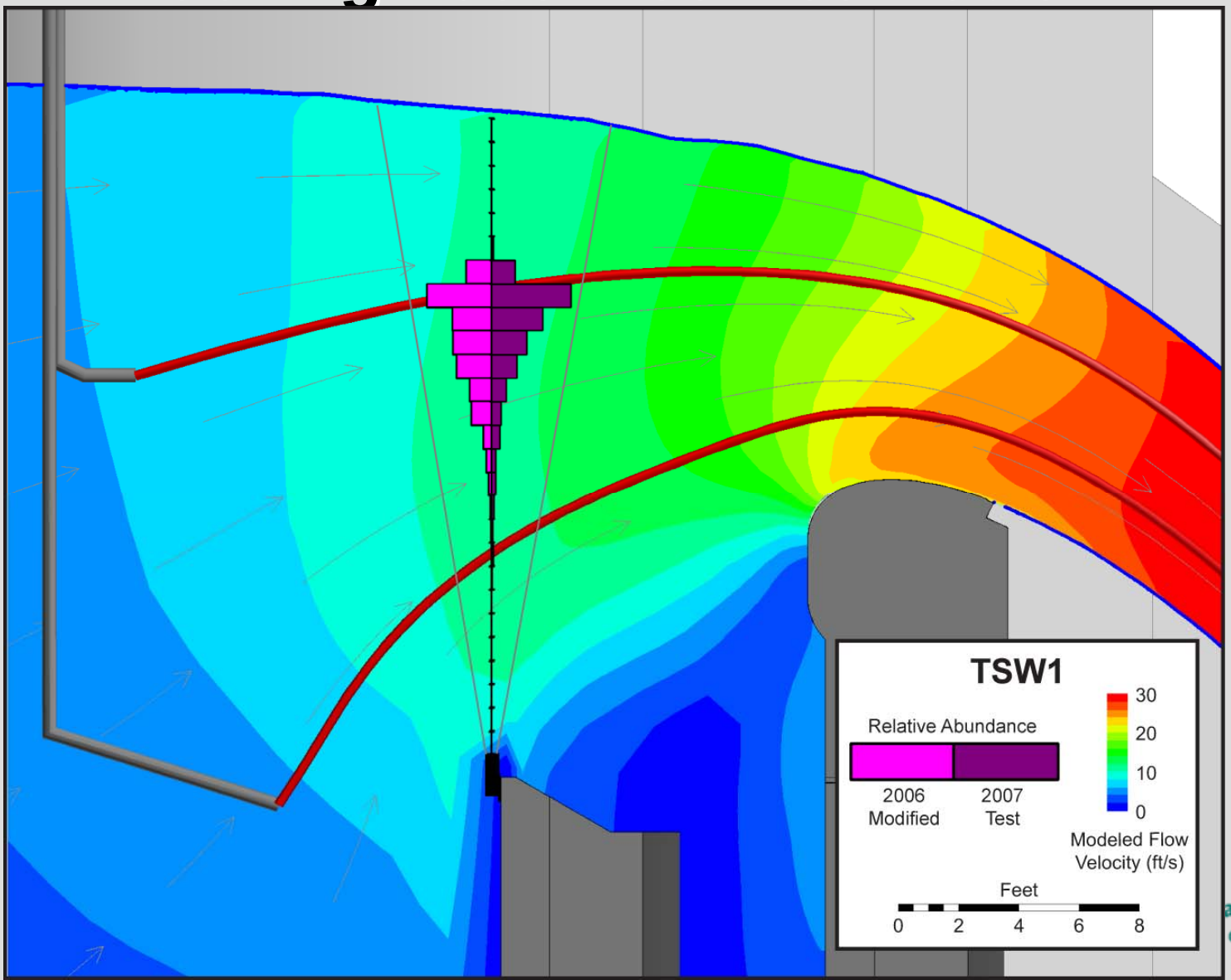
Transducers Mounted on Concrete at TSW2



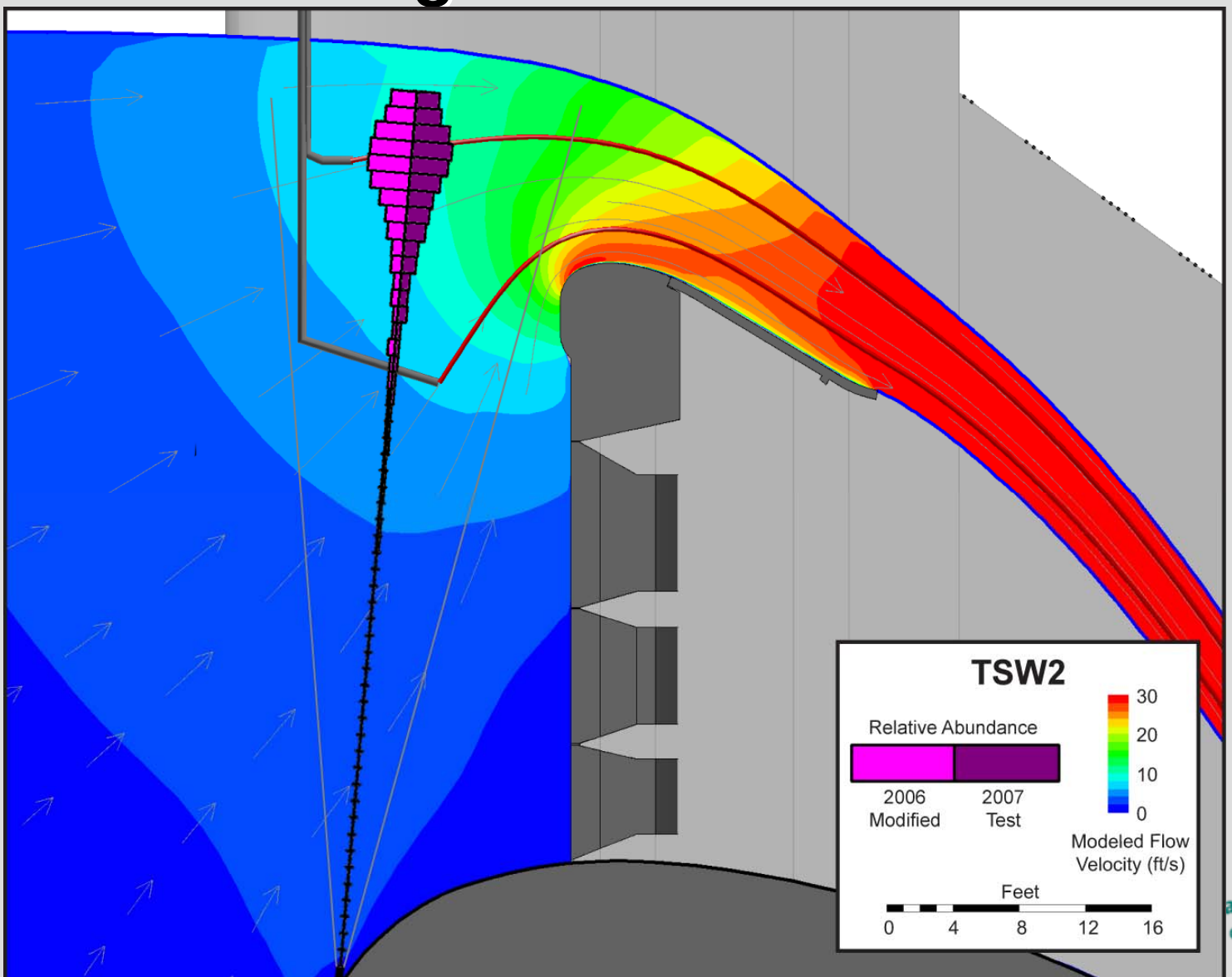
Results

- Vertical Distributions of Fish
  - Compare between treatments in spring and summer at both TSWs
- Proportions below release pipe elevations
  - What proportion of run-at-large fish would experience similar conditions and potential for injury suggested by balloon tag study results

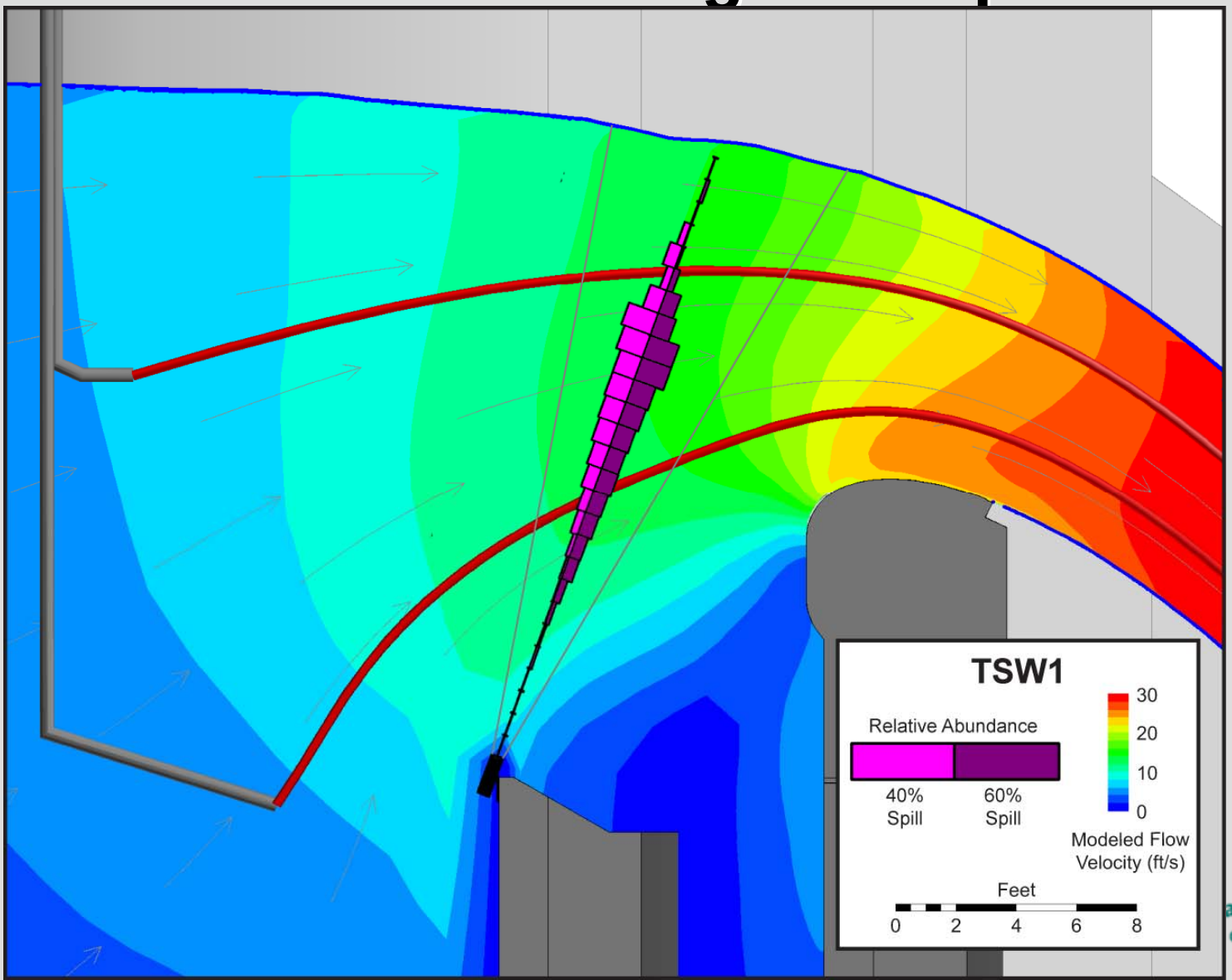
Fish Deeper at TSW1 in Spring during 2006 Modified Pattern



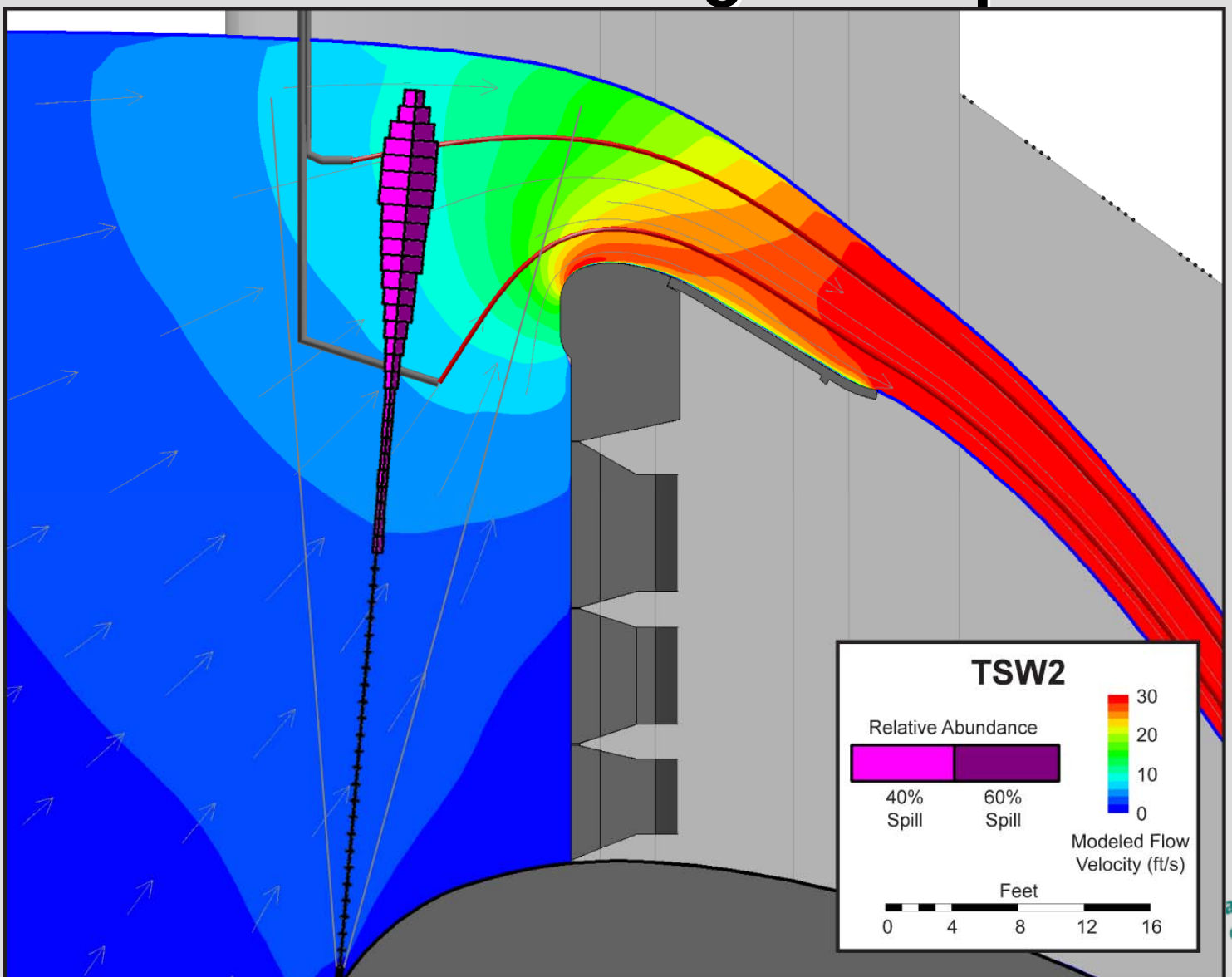
Fish Deeper at TSW2 in Spring during 2007 Test Pattern



Fish Deeper at TSW1 in Summer during 60% Spill



Fish Deeper at TSW2 in Summer during 60% Spill



Few Fish Below Deep Release Pipe

	Release elevation (ft above crest)	Spring	Summer
TSW1	Shallow (329 ft amsl)	75%	80%
	Deep (314 ft amsl)	1%	12%
TSW2	Shallow (332 ft amsl)	65%	76%
	Deep (319 ft amsl)	2%	6%

Conclusions

- Run-at-large fish deeper in the Summer
- Spring Fish
  - Deeper during 2006 Modified at TSW1
  - Deeper during 2007 Test at TSW2
- Summer Fish
  - Deeper during 60% spill
- Release Pipe Elevations
  - Very few run-of river fish pass at or below lower release pipe elevation

Acknowledgements

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  - Ann Setter, for overall project oversight
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- University of Iowa
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